

PIT MANUFACTURING

IMPLEMENTING AND IMPROVING THE MANUFACTURING PROCESS

Manufacturing a pit consists of 42 unique processes. More than 100 sets of work instructions are contained in these processes. All work instructions meet quality assurance, health, safety, environmental, and security requirements.

In April 2003, Los Alamos made its first certifiable pit. The QUAL-1 pit meets Department of Energy quality requirements and the design requirements and specifications of the design agency at Los Alamos. When certified, future production pits for the W88 weapon system will be manufactured according to this process and then placed into the stockpile.

Having improved many of the manufacturing processes since 2003, Los Alamos faces a new challenge for 2007: It must complete a new certification process for the new pits. To ensure it meets this challenge, the Laboratory plans to manufacture the necessary pits each year from now until then—this process will help personnel monitor the production processes and establish more-robust production techniques. Thereafter, Los Alamos plans to produce a nominal number of stockpile-worthy pits each year, thus providing a valuable service to the nation until a new manufacturing facility is constructed.



The Manufacturing Quality Systems Team provides quality engineering, product engineering, and manufacturing systems support to ensure that pits are certified and placed into the stockpile.



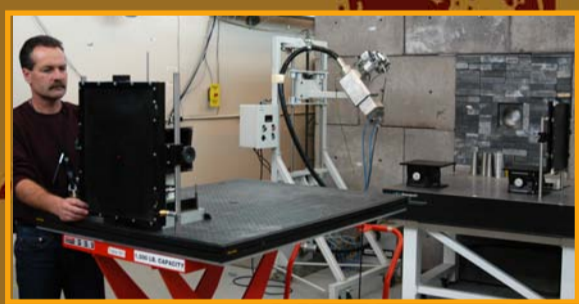
Workers monitor a casting operation. The casting furnace is shown at left, inside a glove box.



The Dimensional Inspection Team uses high-precision gauges to measure pit dimensions to an accuracy of a few micrometers. To understand the nature of such accuracy, consider that a human hair has an average diameter of 75 micrometers.



The Actinide Analytical Chemistry Team conducts analyses on a variety of product materials such as electro-refined metal, cast metal, and gas samples. Members of the team, pictured above, certify the quality of materials used in pit manufacturing.



High-resolution radiographic inspections of assembled pits are set up. Both low- and high-energy radiographs are used to characterize the pits and identity potential defects.



The Standards and Calibration Team provides materials and equipment calibrations traceable to national standards. To minimize turnaround time but retain quality measurements, the team often relies on automation. For example, the pin gauge robotics system shown here uses robots to do most of the work.



The Assembly Team develops new software and diagnostic capabilities.

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